



Entrance test

Mathematics

M62

August 2011

Time allowed: One hour ten minutes

Answer all questions.

It is advised that you work quickly and that you leave behind questions that are taking you too long to answer.

You should only bring in writing material (pens, pencils, erasers, rulers).

No calculators are allowed.

All your rough calculations have to be presented. Answers with no evidence of calculations will not score any marks.

Use the blank pages of the exam paper to do your rough work.

Nothing should be removed from the exam room.

$$\text{Remember } 0.5 = \frac{5}{10} = \frac{1}{2}$$

Question 1

Solve $2(x^2 + 10x + 25)(x^2 - 10x + 25) - 2(x^2 - 5^2)^2 + 25x(5 + x)^2 - 500x^2 = 0$

Answer: $x =$, and .

Question 2

If $v = u + at$ and $v^2 = u^2 + 2as$,

find s in terms of u , t and a (note there should not be a v in your answer). From your result

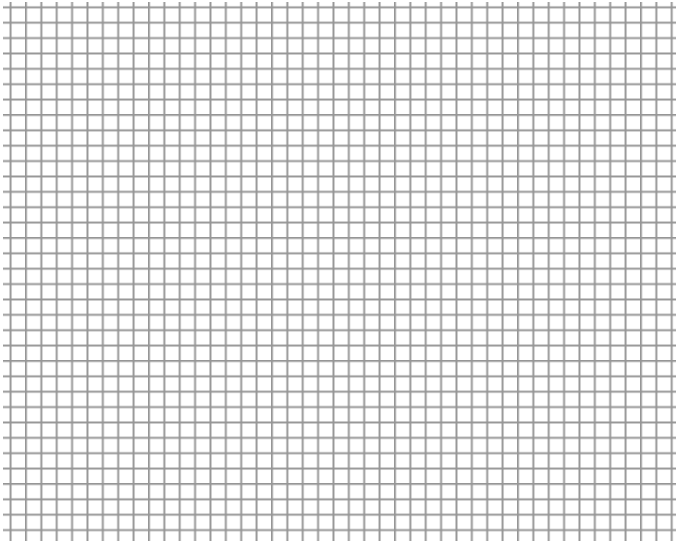
a) find t in terms of s , u and a , b) the value of s when $u=84$, $t=6/7$ and $a=9.8$

Answer: $s =$

Question 3

Two square carpets are such that the perimeter of one is 44 metres longer than the perimeter of the other, and also its area is 187 square metres larger. What is the size of each carpet?

Question 4 Draw the $x+y=4$ and $2x=y+5$ for the values of x between -1 and 5 ($-1 < x < 5$), clearly showing the point of intersection and the points where the lines meet the two axes. Use your diagram to find the area of the triangle formed by the two lines and the x -axis.



Question 5 Find the value of A when $A = \frac{3a - \frac{1}{3a}}{3a + 1} \times \frac{a^2 - 4}{a^3 + 8} \times \frac{6a}{3a - 1} \times \frac{\frac{a^2 + 4}{2} - a}{\frac{2}{a} - 1}$

Answer: $A =$.

Question 6.

In a triangle ABC, AH is the bisector of angle $\angle BAC$ and CK is the line perpendicular to AH ($CK \perp AH$) which meets AB at K. If $\angle ABC = 80^\circ$ and $\angle ACB = 40^\circ$ find angles $\angle BCK$ and $\angle AKC$ and show that triangle AKC is equilateral ($AC=AK=KC$).

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Answer: $\angle BCK =$ and $\angle AKC =$.